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The effects of the presence of a kitchen house on the wind flow surrounding a low-rise building
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Abstract
Most Malaysian rural houses are categorized as non-engineered buildings and vulnerable to damage during events such as windstorms due to the fact that these houses lack engineering considerations. These houses are characterized by having an attached kitchen house, and many of these houses were previously damaged by thunderstorms. The current research investigated the air flow characteristics changes surrounding these houses as a result of the presence of the kitchen. The roof pitch, position, gap height, and overhang were investigated using computational fluid dynamics (CFD) simulations. The results showed that the kitchen position at the center resulted in a slight increase in the suction on the ridge of the roof; however, it significantly altered the flow pattern in the windward and leeward directions. The results also showed that the roof overhang, roof pitch, and kitchen position contributed severely to the damage of the rural house. Moreover, the highest suction occurred at the roof ridge when the kitchen was located at the center of the rural house (Cp = -2.28). Therefore, the authors believe that it is more advantageous to have a kitchen connected to the core as it reduces the pressure on the roof of the core during thunderstorm events.

Author Keywords
CFD simulation; Kitchen house; Rural house; Wind flow

Index Keywords
Computational fluid dynamics, Flow patterns, Kitchens, Roofs, Thunderstorms; Air flow, Computational fluid dynamics simulations, Gap height, Low-rise buildings, Malaysians, Non-engineered buildings, Rural house, Wind flow; Houses

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